

# BITS, BYTES & PIXELS

LIMA 99/4A USERS GROUP



December 1993

Volume 9, #12

DEAR GARY BOWSER:

an open letter from Charles Good  
Lima Ohio User Group

Enough is enough! You have hurt too many members and friends of the Lima Ohio User Group by taking their money and not delivering the paid for goods, not answering correspondence and phone messages, and refusing to refund money paid for goods not delivered. Last May you sold a dealer at our annual MUG Conference defective POP CARTS and have declined provide working replacements. In this newsletter are letters from Australia, England, and Belgium about what is probably several thousand dollars paid for goods never received. UNLESS I hear from the authors of these letters that they have either recieved their merchandise in good condition or full refunds, I WILL NOT ALLOW YOU TO HAVE SALES TABLES OR SEMINAR TIME at the May 14, 1994 Lima MUG Conference.

Sincerely,  
Charles W. Good, MUG Conference  
Coordinator.

November 4, 1993

Dear Charles

OPA has still not made any delivery of my order of March 1992, US\$125 paid out for nothing. Requests for refunds have been ignored. Indeed all letters have been ignored. Bowser is clearly a crook, and I suspect that if he lived in the UK or even the USA would by now have been dealt with.

Stephen Shaw  
10 Alstone Road  
Stockport Cheshire SK4-5AH  
ENGLAND

Brussels, September 3, 1993

Dear Charles,

I take the opportunity to let you know that here in Europe have some

difficulties with Gary Bowser. Enclosed one of the letters I wrote from a member from our club. I have read in MICROpendium several months ago informations about his company. Gary never answer, keep the money, don't send the goods.

Perhaps if you have a contact with him a miracle can happen. In our TI club we are four people waiting for an 80 column card. I let you appreciate if it must be said in your newsletter, so other people in the TI community don't fall into the O.P.A.'s trap.

André Cornélis  
rue Henri Deleers 55  
B 1070 Bruxelles  
BELGIQUE

Sincerely,

J. M. Delbauve  
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B - 4020 LIEGE  
BELGIUM

Delbauve 104 Robermont B 4020 LIEGE

OASIS PENSIVE ABUCATORS  
Gary Bowser  
432 Jarvis Str., suite 501/502  
Toronto, Ontario  
CANADA  
MAY 2H3

Liège, July 16, 1993.

Dear Sir,

I think you remember me. last year, August 14 I have sent an order and PAID CDN \$ 305 with an I.M.O. (see enclosed copy) for :

One T.I.M.  
One RAMBO  
ONE ROS 9  
And shipping to Belgium

At the present time I only get RAMBO on November 5, 1992 and the same month a letter wich tell me that T.I.M. isn't available before December!

Recently, I have read in Lima Bits, Bytes and Pixels May newsletter that you had T.I.M. at the fair

So, I suppose that now the card is ready. PLEASE tell me when you expect to ship my card and at the same time what can you do for ROS 9; did you have a replacement product?

By the way, André Cornélis (you met him last year in september in your office) told me a few days ago that he has no answer for RAMOS sinds February, he is also interested for a T.I.M.!

Hope an answer very soon.

Sincerely,

LETTER from AUSTRALIA - No. 6 Sep / 93

A week or so ago we were down in Sydney for the weekend visiting William. Nothing for it but we had to go out with him to see Jurassic Park which had opened in Australia just a few days before. This was his second time at this movie, the first being a few days before on its second day with the whole office where he works - yes, all 24 of them, with more than just passing interest as graphics programmers and animators. This leads as I found to comments on things like imperfections in matting in of the dinosaurs. All mightily impressed though. This is not a movie review here, but it is worth noting that unlike most movie and TV efforts showing computers which range from fantasy to excruciating, this one looked for real in scenes where people were using computers even to regular Silicon Graphics users like Will. This extended to running the computers in the film with modified video boards at 48 Hz frame rate and synchronized to the film camera (film uses 24 frames/sec) to eliminate the moving black bands or heavy flicker normally seen on TV films of actual computer screens. Your editor Charlie should take well to a movie in which almost the first word uttered is "palaeobotanist".

Last weekend was not a happy one at Funnelweb Farm. We had not seen our resident mother possum for some days, and on Saturday morning Val heard a noise at the front door, and there was mother with a now fairly large baby on her back climbing painfully up the front screen door to a temporarily open space a couple of meters deep between the floors. She had been savaged by a dog but the little one was unharmed. We managed to snaffle junior, now old enough to be semi-independent - you wear garden gloves while doing so and pop the little critter in a hessian potato sack. Then you can let it peek out while holding the bag, which I ended up holding this time. It took a lot of coaxing to get mother possum to drag herself back out of the hole. When she did, Val, with gloves and sack of course, was able to bring her down and hold her quietly. Brush-tail possums usually bite and scratch and can do a lot of damage while being able to wriggle out of the tightest grip, but this one was so far gone that she could only lie quietly in Val's arms and take some water from a spoon, even some banana being too difficult, now she could see that junior was safe. The lady from the Native Animal Trust came around and took mother possum and son off to the vet. She was very relieved that we had captured the possums first. The sad but expected later news was that mother possum was too far gone to survive, but at least the little one will get a chance. I am deeply angry at irresponsible dog owners. It is supposed to be an offense to allow a dog to harm protected native animals, but if you do not catch it in the act then there is little that can be proved.

Some have wondered why we have this fixation on funnelweb spiders around here. Just recently there was a repeat

showing of an excellent TV natural history special on spiders, mostly Australian. I expect that this would have or will be shown in the US of A as National Geographic was one of the partners in making it, so if you have any curiosity in this area do not miss it when it comes to a TV set near you. The program is called "Webs of Intrigue" and is presented by Densy Cline.

Some things seem to be the same no matter what type of computer you have - suppliers who are incompetent or shonky in varying degrees. It is not that many years ago that even IBM threatened to leave Australia if computers were brought under consumer law that insisted that computers compute as claimed. Car warranties just depress me! I bought at considerable expense a Canadian product for my home 486 PC, an ATI Graphics Ultra Plus video card. Though it took a second try to get one that would pass its own self-diagnostics (the supplier all the while denying the first one was faulty), the hardware generally has a good reputation, though murmurs are now surfacing about that too. What ATI definitely appear to be unwilling to do or incompetent at is software. Now video handling with DOS on PCs is a disgusting mess, with separate drivers seemingly needed for every major DOS program. Maybe ATI has done those adequately, but when you get to a more abstracted level the picture is not so good, and the OS/2 support is abysmally bad. Despite ATI advertising OS/2 support, what has emerged has been incomplete, very late, and buggy. I am not yet game to install the latest offerings. So like most OS/2 users with these cards I scale back to the 8514/A simulation with the IBM driver, while all that very expensive video co-processor remains effectively unused. I shall certainly avoid buying any ATI product again. Over recent years I have bought quite a number of PCs at work, and it seems that the process of getting them up and running on all fronts is becoming steadily more traumatic. If you don't test them thoroughly then you may find yourself in post-warranty trouble. Murphy guarantees it.

Some have a theory that you rarely if ever find both hardware and software competence in the same company. That's how Will got into the Amiga/SCSI business, by working as the programmer with a hardware designer who needed software expertise to make a real team. And while on the theme of shonky suppliers, Will has several kilobucks of his part time earnings while a student tied up with DMI, a San Diego area video board firm which never delivered the product and is dragging forever on refunding the \$\$.

While we are on this subject I should mention that I have a unknown, but perhaps very unusual distinction in the TI scene. Years ago I actually got my money back from 99er Magazine! Maybe I just got in early enough or made the right kind of noises. We had relied on borrowed copies in the early days, and the editorial content though never very impressive did seem to be improving in the run-up to the

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99/8, which I was waiting for impatiently. So I took out a subscription, and then about one or two much delayed issues later it looked like losing the plot, so I jumped in and cancelled. Which brings me to the strange case of OPA. There do seem to be some serious unresolved matters here. My friends in the Sydney UG ordered a whole pile of TIM/SODs, paid for and never delivered - this has badly damaged the TI scene in Australia. It seems though that Gary Bowser just refuses to communicate about the matter, not even to deny any liability. I have tried recently on behalf of Sydney also with no response - I know the e-mail did not bounce. Yet the strange thing is that OPA still appears on the networks and at fairs and offers products, even, I am told including the TIM on occasion. There seems to be an attitude expressed in that strange letter from OPA that appeared in MicroPendium that as money paid for orders a couple of years ago went to pay living expenses at the time, then customers should not expect to receive product. Customers might expect otherwise, and even Ontario law cannot be so wide open as to countenance such goings on. From what I have seen of the one TIM/SOD that made it to the Hunter, it was indeed a good product, and the Vn 8.1x HRD ROS as supplied by Bud Mills has been a real contribution, despite its limitations. Trouble is that nothing else OPA has produced in a long while now seems of any real significance.

On the TI front at Funnelweb Farm, there is both good news and bad. The bad is not intrinsically so, just that I have not found much time or energy for programming or much else on the TI since releasing the Vn 5 Editor. The good news is that after Geoff Trott's latest ministrations, the HRD-3000 at long last seems to be behaving itself. I may even work up to getting some more 128Kx8 SRAMs, if local suppliers have heard of them yet, to bring it up to a more useful size. Am I game yet to retire a 192Kb HRD to duty as a memory expansion test bed? Maybe it is time to look at patching the ROS to handle DSQD equivalent. With the all-seeing benefit of hindsight, it now seems a great pity that the HRD design did not originally include both ROM and RAM in the initial DSR space. It needs both, ROM at >4000 including power-up check routines for ruggedness and SRAM to carry the configurable information that has to be accessible to a standard DSRLink search and for more working room if needed. The fragility of the DSR header has always plagued HRD users, and the attempt at an EPROM sold in the past was not really successful.

I have had a browse through the Asgard AMS memory expansion user guide on disk, but any opinions of this memory expansion scheme formed and expressed here are from that and net-news items only, and not from actual experience. The memory expansion scheme itself appears quite livable with, paging in 4K blocks from a large pool into the usual TI low and high memory spaces. It will not reproduce the full function of TI's own 128K expansion, but seeing as these were never released and there were so few anyway it hardly matters, and it is otherwise more extensible by addition of

more memory. It does reside at a fixed CRU base, but this is up high at >1E00 and so avoids the low range crush (the TI lived at >1200). I do question the lack of a DSR. This is promoted as a virtue, but that seems like trying to make a feature out of a deficiency, a traditional sport of marketeers. No doubt it saves board area and is cheaper to make. Why would the user want to have a DSR even if it cost more? One reason would be to provide self-test routines accessible from console Basic without requiring even the minimal 32K expansion to be operational (this is one saving grace of the Myarc 512K Ramdisk card). Other desiderata might be an identification call, and a library of routines either callable in place or downloadable preferably as position independent code. No doubt more can be added to this list. I would agree that the full DSRLink mechanism for memory bank selection as in RAMBO on HRD cards is more overhead than desirable, but existence of a DSRLinked control does not imply that more direct access to the low level banking mechanisms is not possible. The access just needs to be clearly and permanently defined, and preferably simple and elegant. As remarked in a previous letter the real problem with banked memory expansion is the decision overhead in handling large data blocks. The programmer with more or less trouble can structure code to work in bank sized blocks with little run-time overhead. These things are not trivial either - look at how Microsoft with all their billions of dollars and armies of programmers have not been able to make 16-bit Windows work without too frequent crashes. Then again lots of things are nicer on the TI which is why some still like playing with it.

I am not quite so keen on some of the software decisions made in the AMS system (mostly those to do with PAD usage and which may have been forced by the absence of working RAM in the DSR space). A great deal of work has gone into it, and it may be when the RAG Macro-assembler and Linker finally come into their own, in these expanses of paged memory. I have always thought a macro-assembler was gross overkill and even counterproductive in the standard 32K TI-99 environment, but it and the enhanced Linker may well be essential tools for AMS. I do not care at all for the way areas of PAD have been appropriated, in particular the violation of the E/A manual specification (p406) of >83D0-2 as DSR search pointer storage. The TI system specifications are very clear on just what PAD memory a DSR is allowed to trash (some cards like the Myarc FDC use more but restore it on exit). A hardware device that uses the CRU banking scheme for DSRs and claims for itself usage of memory not allocated to such devices is making a claim to ownership of the whole system instead of being one amongst equals. A memory expansion is special, but not all that special.

Putting aside all the rival commercial claims which were coming hot and heavy a while back, it is clear that the TI-99 has long needed CPU memory expansion. Even when the original 99/4 was conceived, a plain 64Kb address space was clearly

## Bits, Bytes &amp; Pixels

not enough for its designers, but the general CPU memory expansion never made it out the door before Black Friday. This has ever since cramped the style of programmers and limited the scope of applications. We are never going to have the luxury of wide open linear address spaces on the 16-bit 9900 series CPUs no matter how extra memory is paged in, but the 99/4a system can support a substantial amount of extra CPU memory. The 9995 CPU in the Myarc Geneva can realistically support even more just because it is faster, despite its on-chip memory block not being in a very suitable place for 99/4 emulation. Just as an aside I learned recently that the 9995s used in the 99/8 were specials with on-chip memory disabled. Back to the main train of thought -- Myarc for their own reasons never made flexible memory expansion available on the 99/4a, limiting it to the generally difficult to use all-at-once scheme of the 512Kb RamDisk card, even though the technical means now being used in the AMS card were available before then. Realistically at this stage in the life of the 99/4a the market can support at most one such device, and the AMS card appears to have center stage, and I wish them well. Note that I say "appears" as I have seen no external evidence of it yet as a real commercial product.

Since writing the last Letter I have been able to access Delphi and pop up on the TI section every so often under the name GLOBAL01. This may be at very odd times because I telnet via the Internet into Delphi from my office machine, at lunch time or after work Australian time, which tends to make it very late evening or early AM in USA. The connection from Australia is usually pretty hesitant - I don't know what Delphi is like on its home ground - but an extra layer of packetized communication across the Pacific can only make it deteriorate, and I often have a long delay before keystrokes register on my screen. I think it has improved a little since the link out of Australia moved from satellite to cable. Sometimes initial access times out waiting for the password. Each time I check any mail and read the Forum entries. So if you have any queries feel free to make them by this channel, and I will answer them there as best I can. If any warnings or easy bug-fixes come to light for FW, I will post them in the Forum. I do not currently have any way to capture whole files, and typing more than short replies directly on Delphi is difficult and inaccurate because of the long key response delays. So any long detailed communications are best sent to my Internet e-mail address if you have that facility. I have already communicated with various people in USA and Europe at their xxx@delphi.com addresses in the last few months, so if you have Internet access my e-mail address is at the end of this letter. Once I forgot to put the .com on delphi at the initial telnet - a local Zeus answered - but thought he was a Vaxstation 3100 and not a greek god.

Perhaps I should end with a philosophical puzzle. The other morning I was out for my morning exercise walk in Blackbutt Reserve when I heard a tree fall (real T. Rex

sound effect stuff), but even though I walked back down the trail a way, I could not see where it fell. Was it real?

Tony McGovern  
Funnelweb Farm  
Sep / 14 / 93  
e-mail -- phpan@cc.newcastle.edu.au  
Delphi -- GLOBAL01

**\*\*DONE\*\***

### THE OCTOBER 1993 CHICAGO & MILWAUKEE FAIRS

by Charles Good  
Lima Ohio User Group

There isn't a lot of earth shaking news to report from these shows. There were no major new hardware or software announcements. The enthusiasm of those present shows that 10 years after Black Friday there is still plenty of life left in the old trusty TI. Some observations, not in any particular order:

Both shows had the air of a flea market. I saw no 80 column devices or hard drive controllers for sale, but there were plenty of bargains. I picked up a bunch of \$0.50 modules, a \$1 set of TI joysticks, and a \$3 speech synthesizer all for a new member of the Lima group who is 11 years old and who just got his computer a few weeks ago. For myself I acquired a \$20 8 inch green monitor and a \$1 monitor cable for a new system I recently acquired. I should have waited until I got to Milwaukee. There were a couple of green monitors there for \$10 each.

ASGARD was represented by Ramcharged Computers who were only selling their prepackaged software and were not offering free updates or giving seminars. This is the first year Chris Bobbitt wasn't there. I was told that he will no longer be involved in the software aspects of Asgard's business.

Competition Computer had a BRAND NEW video controller side car peripheral with all cables and docs for sale. This is a very rare bird. I had only seen one once before and not with all the cables. I asked Competition's Ted Kieper the price and he showed me his official blue 1982 TI price list where the video controller lists for \$699. It eventually sold for \$300 to one of the two European visitors to the Chicago show. At the end of the day Ted sold several dual drive kits for \$25 (2 half height DSDD drives, all needed cables, a template to show you where to drill screw holes, and directions all shrink wrapped into a neat package). I bought one for my extra system.

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## Bits, Bytes & Pixels

I got to meet Micropendium's John Koloen and Laura Burns. This is the first time I have ever seen Laura, and asked her why she had not been to a Chicago show before. She explained that "her baby" is now away from home at college and this frees up some of her time. Laura is a very charming lady.

Mike Wright showed off PC99 in a seminar. Except for 80 columns and speech it seems to be able to fully emulate TI software from disk or cartridge. You can take any TI disk and convert it into a file on a PC disk using PC transfer or by cabling the PC and 99/4A together. PC99 is entirely software on an MS-DOS disk. You need at least a 386/30 to get the thing to run as currently configured, and about a 486/50 to get PC99 to run almost as fast as a real TI, but speed improvements are anticipated. PC99 allows very complete debugging of 99/4A software. You can step through the assembly or bPL software from outside the 99/4A environment, something not possible with any other debugging tool. You can have up to 16 cartridges "on line" with the REVIEW MODULE LIBRARY feature using PC99, and any cartridge ever sold by TI is available for purchase in PC99 format in case you don't already own the cartridge.

Bruce Harrison demonstrated some of his public domain software, including the latest incarnation of his extended basic compiler. He went through the entire processes of creating a compiled program. As it stands now, his compiler will handle almost any previously written XB program, including those that load in assembly support. The compiler speeds up some common XB operations and leaves the rest at "regular" XB speed. Bruce keeps adding to the list of XB operations that are speeded up by compiling.

The SCSI DSR still isn't done. Last year Bud Mills made the same mistake Asgard made with PRESS, selling an incomplete product. Bud says anyone who bought a SCSI card and wants a refund will get a prompt refund. 4A MEMEX wasn't ready either. In fact, a source told me that there has never been a 4A MEMEX prototype built.

There were vendors at both shows selling products not at all related to computers. They seemed very out of place. A real estate outfit had a table at the Milwaukee show. At Chicago this really friendly guy named James Ashworth looked at my name tag and said "Charlie, can you send me a list of your group's membership?" I said, "I don't see why not," and had him write down his name and address. He asked the same from representatives of some other user groups. When I later listened to the cassette tape this guy was giving away I learned that he was pushing some sort of a "get rich quick" pyramid sales scheme, similar to the way Amway now sells stuff or the way TRONICS used to sell 99/4As. His audio tape had interviews with "distributors" and "full distributors". The only ones who make money this way are those at the top of the pyramid. I don't know what he was selling, but he isn't getting the Lima group's membership list. This kind of thing has no place at a computer show.

**\*\*DONE\*\***

### TWO TONE THAT TI KEYBOARD! A simple keyboard alteration by David Hetkerthin Lima Ohio User Group

As you probably already know, there are two colors of TI keyboards, black and tan. but what you probably didn't know is that there are at least two types of posts attaching those keys to the keyboard. There are the more common HOLLOW square or (O) posts and the less common SOLID or (+) posts.

If you have, or know someone else who has a keyboard of the opposite color and the same post type, then you BOTH have the opportunity of having a TWO-TONE keyboard which will make programing and games like "Amazing" easier.

Suggested keys to swap and make a contrasting color are: ENTER, FCTN, ALPHA-LOCK, \$4, +=, J,K,I,M,E,X,S, and D.

The only tool needed is a large paper clip, straightened out and bent into a "J" or fish hook shape. Keep the hook small. Insert the hook between the keys and lift GENTLY, first one side of the key then the other until the key cap pops off.

As with any hardware modification you undertake, you do so AT YOUR OWN RISK.

Until next time, take care and enjoy your TI.  
D.H.

**\*\*DONE\*\***

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December 1993 BB&P Editor's note: The following article by Bob Carmany is the first in a series. This first article in the series was published several years ago in the Hunter Valley (Australia) user group's newsletter. The rest of the series, which will appear in future issues of BB&P, has not previously been published.

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 Assembler Executing . . .  
 By Bob Carmany

(This is going to be a series of narrations about my "adventures" through the wonderous world of Assembly Language. I have Ron Kleinschafer and Tony McGovern to thank for prodding me into this. If I can try it, anyone can!)

The first thing to do is to find a book for the beginner dealing with the basic ideas of Assembly Language (hereafter called "A/L"). I discovered much to my dismay that the rather extensive manual that comes with the E/A cartridge assumes a prior knowledge of A/L. Anyway, I finally found a rather elementary text on the subject and decided to spend some time learning to program in A/L -- after all, it was supposed to be easy!

I quickly discovered that books aren't written in logical order. This one was making comparisons between XB and A/L coding and I decided that wasn't the best way to start. You have to understand some basics before you can get tha far. For example, there was a good deal of discussion of converting numbers from one base to another --- a good place to start!

There are three number bases that we have to deal with in A/L programming. I could see that this was going to be fun! Binary (zero's and one's) is the only language that the computer understands. Fortunately, we no longer have to program in binary -- an interpreter does that for us. The other two number bases are hexadecimal (base 16) and decimal (what we all learned in school). I could see that this was getting easier all the time. One of the number bases had already been eliminated. All I had to do was learn how to convert a number from decimal to hexadecimal and vice versa.

OK, let's see what the book has to say! You take the decimal number and divide it by radix 16. I didn't know there was gardening involved in this! I have a whole row of radixes planted out back --- my error, that's radishes! Sorry, back to the task at hand. This is awful! You have to keep track of these "F's" and "A's" when you divide the numbers for the conversions. Anyway, I managed to get through the exercises in the book but it must have had the wrong answers in a couple of places because they didn't agree with my results at all! I could see right off that I had been sold a "blind horse" by Ron and Tony! You know what? I got through the whole chapter and you know what the book said? "The easiest way is to use a decimal to hexadecimal calculator or a computer program to do the calculations for you". Hmmm! I think I just happen to have a program that does that. In fact, it gives you the equivalent in all three bases! So much for that chapter and here is the conversion program.

```
100 ON WARNING NEXT :: CALL CLEAR :: H$="0123456789ABCDEF" :: PRINT
"DEPRESS YOUR ALPHA LOCK KEY": : "PRESS LETTER FOR INPUT BASE": :
```

```
110 PRINT : : "D=DEC # H=HEX # B=BIN #": : : : CALL SOUND(80,660,6)
```

NEXT PAGE

```

120 CALL KEY(O,K,S):: IF S<1 THEN 120 ELSE ON POS("DHB",CHR*(K),1)+1
GOTO 110,13 0,140,150

130 INPUT "DEC #=":DEC :: IF DEC<-32768 OR DEC>65535 THEN 130 ELSE
A,DEC=INT(DEC -65536*(DEC<0)):: GOSUB 200 :: GOSUB 220 :: GOTO 160

140 PRINT "HEX #=" :: ACCEPT AT(23,7)BEEP SIZE(4)VALIDATE(H$):HEX$ ::
GOSUB 180 :: GOSUB 200 :: GOTO 160

150 PRINT "BIN #=" :: ACCEPT AT(23,7)BEEP SIZE(16)VALIDATE("10"):BIN$
:: GOSUB 90 :: GOSUB 220 :: GOSUB 210

160 A=INT(DEC/256):: PRINT "D=";DEC;TAB(12);A;DEC-A*256 :: IF
DEC>32767 THEN PR INT " ";DEC-65536

170 PRINT "H= ";HEX$:"B= ";SEG$(BIN$,1,8)&&" "&&SEG$(BIN$,9,8)::
HEX$,BIN$="" :: A ,DEC=0 :: GOTO 110

180 HEX$=SEG$("0000",1,4-LEN(HEX$))&&HEX$ :: FOR I=1 TO 4 ::
A,DEC=DEC+(POS(H$,SEG$(HEX$,I,1),1)-1)*16^(4-I):: NEXT I :: RETURN

190 FOR I=1 TO LEN(BIN$)::
DEC=DEC-2^(I-1)*(SEG$(BIN$, (LEN(BIN$)+1-I),1)="1"):: NEXT I :: RETURN

200 A=A/2 :: BIN$=STR$(-(A-INT(A)<>0))&&BIN$ :: A=INT(A):: IF A THEN
200

210 BIN$=SEG$(RPT$("00",8),1,16-LEN(BIN$))&&BIN$ :: RETURN

220 A=DEC+65536*(DEC>32767)

230 HEX$=SEG$(H$, (INT(A/4096)AND 15)+1,1)&&SEG$(H$, (INT(A/256)AND
15)+1,1)&&SEG$(H$, (INT(A/16)AND 15)+1,1)&&SEG$(H$, (A AND 15)+1,1)::
RETURN

```

Maybe this isn't going to be so bad after all. I managed to finesse having to calculate all of those conversions by hand with a short program that I found in my library. Let's see, there is something about registers in the next chapter.

This one starts off with a rather innocent statement. It says that there are three internal registers in the TI CPU --- the Program Counter, the Workspace Pointer, and the Status Register. No worries, mate! This doesn't look to be too difficult! The Program Counter (PC) is a special register that keeps track of the address of the instruction to be performed. After the instruction is performed, the CPU adjusts the address to the next instruction. Right --- the same thing as a line number in XB! Geez, I might have to apologize to Ron and Tony for what I wrote earlier. This isn't too bad so far!

Now for the Workspace Pointer (WP) is another register that contains the address of the program's workspace. Whew! A sentence that says absolutely nothing! OK, a workspace is a memory area of 16 words of memory that are accessed faster than the rest of the computer's memory. Each of these words is referred to as a working register. Aha! I bet that is what they are talking about with those R0 to R15 things in the A/L source code. That means that the Workspace Pointer must point to the first of the working registers --

RO --- and the rest must follow immediately in memory. This stuff is getting a little more complicated but I think I can grasp the concept.

Now for the last of these registers --- the Status Register (SR). The book says that it holds the individual status bits that are affected by the instructions are executed. Now that makes no sense at all to me. It seems that each of the status bits is affected differently depending on the instruction executed and they can be read by the conditional jump instructions to make the program branch to another routine. That sound like the "IF --THEN" statement in XB. I guess I'll have to wait until I work with the individual instructions to see which of the 16 status bits they affect. Hey! They even provided a chart:

Name ~~~~~	Abbreviation ~~~~~	Bit Position ~ ~ ~ ~ ~
Logical Greater Than	L>	0
Arithmetic Greater Than	A>	1
Equal	EQ	2
Carry	CY	3
Overflow	OV	4
Odd Parity	OP	5
Extended Operation	X	6
Not Used	--	7-11
Interrupt Mask	I0-I3	12-15

I've heard of some of these at one time or another but I guess I'll just have to wait and see how they can be tested and used by the various A/L instructions.

All of this reading and writing has made my mouth dry! It's time for a cold Foster's (no Toohey's to be had here) and a bit of a rest before I start the second article in this series. I think I'll look at the structure of a bit of source code and maybe see if I can translate some familiar XB statements into corresponding A/L source code. That should be interesting!

\*\*\*DONE\*\*

LETTER TO THE EDITOR FROM AN 11 YEAR OLD

(Aron purchased his first computer, a TI99/4A, from me in early October 1973, sending me \$9 in bills and \$1 in coins through the mail as a down payment on my \$20 asking price. The rest of the money arrived a week later, in cash, obviously out of his allowance. I purchased a whole bunch of very inexpensive cartridges etc. for him at the recent Chciago show. He is obviously getting the same thrill of fun and discovery many of us did back in 1982 and 1983.)

Dear Dr. Charles W. Good

I would like to thank you for the TI-99/4A computer, controllers, video games, tapes, and Speech Synthesizer. you really helped update my computer with the Soeoch Synthesizer. The video games helped to make my computer more fun when I can't think of something to program. The computer and video games and all of the other things are great! Thank you for

the magazine called Micropendium. The computer has really developed my skills on computers. I am going to buy some more things to update my computer even more. I am going to try to get every extra piece of equipment for my computer. When I sent to the Texas Instruments and they gave me alot of info on the TI-99/4A user Groups. That is how I got the info to send and ask you about things and to send the first letter I ever sent to you. TI-99/4A Neato!

Sincerely  
Aron Traver  
20900 W. STATE ROUTE 51  
GENOA OH 43430

\*\*\*DONE\*\*

OOPS

The publication year of the Business Week article reprinted in last month's BB&P was 1983 not 1993. Sorry for the error.

\*\*\*DONE\*\*